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(71) Applicant *(for all designated States except IT US)*: BELGRAVE CORPORATE SERVICES LIMITED [GB/GB]; 55 Gower Street, London WC1E 6HQ (GB).

(71) Applicant *(for IT only)*: DIGIFOUR S.R.L. [IT/IT]; Via Augusto Vera, 19, Roma (IT).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: SALPIANI, Giampietro [IT/IT]; Via Colle di Mezzo, 19, I-00143 Roma (IT).

(74) Agents: BANCHETTI, Marina et al.; Ing. Barzanò & Zanardo Roma S.p.A., Via Piemonte, 26, I-00187 Roma (IT).

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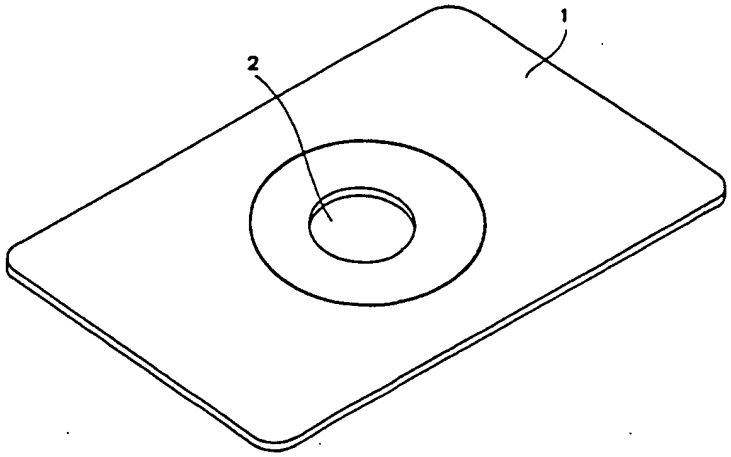

(57) Abstract

The invention concerns an optical medium for non-volatile data storage, characterised in that it comprises a data storage layer readable within disc reading-writing units, by the provision or not of an adapter unit. The invention further relates to adapter means for writing and reading said optical medium and to processes for manufacturing said optical medium.

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OPTICAL MEDIUM FOR NON-VOLATILE DATA STORAGE, ADAPTER MEANS FOR WRITING/READING SAID OPTICAL MEDIUM AND PROCESS FOR MANUFACTURING SAID OPTICAL SUPPORT

The present invention relates to an optical medium for non-volatile data storage, adapter means for writing/reading said optical medium and process for manufacturing said optical support.

Before providing a more detailed description of the present invention, it is wished to indicate the meaning of some terms according to the meaning used in the present patent application.

The term "optical support", or "writable support", in the meaning used in the following, indicates a fragment of a mass memory, obtained by the physical or logical fragmentation of symmetrical radial geometry memories (discs) maintaining its relative capacity (data density - byte/cm^2). More particularly, it is meant any lamina coating, either originally, and due to following applications, a storage layer, the reading - writing of which occurs within drives normally employed for reading - writing discs and the stable positioning of which is warranted by an adapter independent with respect to the same drive or by a permanent and specific modification of the charging/driving mechanism of the same drive.

As "symmetric radial rotation motion" it is meant the rotation of a body about an axis passing through its own geometrical centre.

By the term "afference geometry", it is meant the kind of relative motion between the surface of the object and reading - writing group allowing to perform a scanning of the object surface and to modify the optical, mechanical or magnetic features of the same in order to record on the surface of the object a determined amount of data in a persistent way; it will be also employed to reveal, thanks to those surface features previously modified, the data there provided in order to allow the subsequent processing.

By the term "discs or CD", it is meant both the "Silver" type CD-ROM or CDMO (masterized during the industrial production) and CD-R (writable), CD-WR (re-writable), and DVD or DVD AUDIO or DVD ROM or DVD RAM or DVDR or DIVX. The same kind of definition can be used for "radial type mass memory".

Coming now to provide a short picture of the present technology, it is well known that the mass memory units can be divided into three main categories.

The first ones are the memories within which the data scanning occurs according to a radial mode (discs and like), characterised by a radial and symmetrical rotation mode allowing its surface scanning by those receptors for the reading - writing of the memorised data. Notwithstanding the multiplicity of reading - writing technologies (electrical, magnetical, electromagnetic, optical, magneto-optical, ecc.), the particular data afference geometry, whichever is the way they have been memorised, is an unifying factor of this mass memory family.

In other words, they are memories the scanning of which is based on the rotation of a surface tangential with respect to one or more reading - writing devices. Said rotation always occurs in such a way to put the surface of the storage element in a relative motion condition with respect to one ore more reading - writing head; said motion will be characterised by a constant measurability allowing a precise identification of the relative position between the reading - writing group and the mass memory surface.

The second category is the one comprised of memories wherein the scanning of data occurs according to an axial mode (streamer, dat., tape units). They are characterised by a scanning technique based on a relative sliding motion between a reading - writing group and the memory surface, so that the memory surface will be made progressively and parallel sliding with respect to the reading - writing group. In other words, they are memories based on the orthogonal axial, linear sliding, of the memory surface tangent to one or more reading - writing head.

Finally, the third group is comprised of memories the scanning of which is based on electric pulses. Particularly, scanning is based on the storage (transient or permanent) of a matrix or vector of electric pulses. They are microprocessor based memories the scanning of which is not based on a motion, but on a flux of electric pulses.

Another short description must be given about the present technology for the manufacturing of "compact discs".

At present, well known basic technologies for the production of an industrial, non-writable compact disc (known in the field as "silver" disc) provide the following steps:

1. Production of the moulding matrix on the basis of the user data.
2. Assembling of the moulding matrix into the disc moulding head.
3. Charging into the reservoir of polycarbonate grains.
4. Heating of polycarbonate.
5. Injection of polycarbonate into the expansion head.
6. Extraction of the disc.
7. Elimination of the excess of polycarbonate .
8. Passage to the aluminising step.
9. Deposition of the aluminium sheet.
10. Protective lacquering.
11. Possible quality control.
12. Possible moulding or personalization of the back side.

Instead, for the production of a writable "compact disc", usually defined in the sector as "gold" disc, the presently well known technology provides the following steps:

1. Production of the moulding matrix on the basis of the user data.
2. Assembling of the moulding matrix into the disc moulding head.
3. Charging into the reservoir of polycarbonate grains.
4. Heating of polycarbonate.
5. Injection of polycarbonate into the expansion head.
6. Extraction of the disc.
7. Elimination of the excess of polycarbonate .
8. Passage to the dye opposition step.
9. Charging of the dye reservoir.
10. provision of the dye layer on the disc.
11. Drying of the covering dye.
12. Washing and automatic trimming of the disc edge, thus creating a reference edge preventing that the polycarbonate disc circumference coincides with the covering disc circumference created by the dye provision.

13 Protective lacquering of the disc treated surface.

14. Drying of the protective lacquering.

15. Possible control of the surface homogeneous structure.

16. Passage to the gold-plating step.

17. Gold-plating (provision of the gold layer).

18. Possible random quality check.

19. possible mould or personalization of the back side.

In view of the above, main object of the present invention is that of providing a new category of mass memory supports, deriving from the known technologies for the manufacturing of "discs", which, even maintaining the physical/chemical features of said technologies, and consequently the relevant capacity and persistence of the memorised data, are morphologically and dimensionally modified in order to allow a higher transportability and thus the possibility of using them everywhere.

Particularly, the object of the invention is that of allowing the radial reading - writing and in any case the scanning of an optical support not only by the usual rotation or orthogonal sliding modes of the planar storage surface with respect to a reading - writing group, but also by an "orbital type" motion of the surface, so that, on the basis of this dynamic model, applied to the system resulting from the connection between the storage element with its adapter or any kind of mechanism assembled within a disc drive, the complete utilisation of the surface of the optical support can be obtained, also in those zones that, due to their position, should not be included during the scanning motion within any circumference concentric with respect to the rotation axis of the same optical support.

This result is obtained according to the invention by bringing according to a cycle the storage surface included between said zones to be tangent with respect to the reading - writing head, where the different scanning and writing steps will be suitably synchronised with respect to the rotation period of the same optical support (intercalating synchronisation of the reading - writing group head).

The coupling between the orbital motion of the optical support and the intercalating writing - reading activity of the head will allow to sequentially and without any interruption reconstruct the integrity of data bus, thus adapting a normal peripheral unit, originally designed to house discoid symmetry memories, to house memories having different geometry

and heterogeneous provenience, allowing that on said memories all those reading - writing operations usually occurring on the discs occur.

These and other results are obtained according to the present invention by employing techniques and accessories designed and implemented in order to ensure the correct sensibility and readability of said new mass memory category within standard disc reading and reading/writing units (optical, magnetic, magneto-optical).

It is therefore specific object of the present invention an optical medium for non-volatile data storage, characterised in that it comprises a data storage layer, readable within disc reading - writing units, by the provision or not of an adapter unit.

Still according to the invention, said optical medium can be holed, provided with a symmetrically centred hole or with a symmetrically eccentric hole.

Still according to the invention, said optical medium can be holed, provided with a symmetrically centred hole or with a symmetrically eccentric hole, with magnetic band opposition, bar codes, microprocessor, "contactless chips" and holograms.

Furthermore, according to the invention, the optical medium can be of the not holed type, with an orbital afference geometry.

Always according to the invention, the optical medium can be of the not holed type, with an orbital afference geometry with magnetic band opposition, bar codes, microprocessor, "contactless chips" and holograms.

Preferably, according to the invention, said optical medium can be obtained by cutting a previously manufactured disc, particularly said disc providing frontally, or on its active surface during the reading - writing operations, a plane and integral surface for the data storage.

According to the invention, said optical medium obtained from a finished disc can be variously shaped during the cutting step in order to obtain memories having different shape and data storage capability.

Furthermore, according to the invention, said optical medium can be realised by employing a specific production line.

Preferably, the optical medium can be obtained as a flat lamina, having a shape different with respect to the disc shape, obtained by the opposition on a rigid or slightly flexible support of film, composite sandwiches (chemical reagents, photosensitive materials and magneto

reactive materials) covering laminae, thus creating on its front part a surface the optical, physical and chemical property of which are analogous to those of the "disc units" presently manufactured (CD-ROM or CDMO, CD-R, CD-WR, DVD or DVD VIDEO or AUDIO or DVD ROM or DVD RAM or DVDR or DIVX, magnetic discs, magneto optical discs) and that can be written and read within normal disc units (reading units, reading/writing units).

Furthermore, according to the invention, said medium can be obtained by varying the geometries of the existing production lines.

According to a preferred embodiment of the invention, said optical medium is read by an orbital scanning.

The invention further relates to adapters to allow the reading of the optical medium by traditional reading - writing units.

According to a first embodiment of the adapter according to the invention, it is dimensioned and shaped in order to be placed within the disc drawer or charger of a normal reading unit or reading/writing unit and to reduce the "housing space" to allow a stable and precise introduction of an optical medium within the reading or reading/writing unit.

Preferably, said adapter will be shaped in such a way not to hamper the relative motion between the "front portion" (active surface) of the optical medium and the reading group, or reading-writing group of the same apparatus.

In a second embodiment of the adapter according to the invention, it provides a mechanism for hooking to the optical medium, to connect them each other, is such a way that the adapter will be integrally dragged with the optical medium during the motion generated by the internal disc reading unit, reading/writing unit mechanical, thus contributing to equilibrate and stabilise the trajectory of the optical medium within the reading unit, reading/writing unit.

A third embodiment of the adapter according to the invention provides an optical medium drawer or charger adapter, shaped in such a way to properly house and position the optical medium during the optical medium charging, hooking and dragging operations within the reading unit, reading/writing unit, and in such a way it is possible temporarily or definitively assembly it with a standard disc reading unit or reading/writing unit.

Always according to the invention, said adapter can be realised in such a way to integrate to the above mentioned functionalities the optical interface function with the drive reading - writing group in order to drive the proper positioning during the optical medium reading/writing steps.

Still according to the invention, said adapter provides the integration of the above mentioned functionalities with the interfacing function with a memory chip or microprocessor of any kind and model and that translates the I/O (input/output) signals, originally as electric or magnetic or electromagnetic pulse train into optical pulse train to be received and acquired by the reading - writing group of an optical disc drive.

The solution suggested according to the present invention allow, among the others solutions, to segment a radial type mass memory into a plurality of divided fragments, and to subject them separately and synergically independently each other to radial/orbital reading - writing operations, either with respect to the processing times, and with respect to the amount and kind of data involved in the reading and writing operations.

Further, the solution suggested according to the present invention allows to produce a single memory support, independently with respect to a disc as a blank.

The invention further allows to obtain disc fragments the shape and dimensions of which are included within the range provided by the ISO rules for the validation of optical and credit cards; said fragments maintaining all the writability, re-writability and readability features of the original means.

In this way it is possible to obtain:

- the creation of little, cheap and transportable memory units destined to store many subset of data;
- the managing of said memory unit, the updating of the data contained and/or the modification of the distributed supports;
- the housing, protection and personalization of the memory units by portable mediums, having different shapes.

The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

figure 1 is a perspective view of a first optical medium according to the invention;

figure 2 is a section view of the optical medium according to figure 1;

figure 3 is a perspective exploded view of a second optical medium according to the invention;

figure 4 is a front view of a second optical medium according to the invention;

figure 5 is a front view of a segmented disc to obtain optical mediums according to the invention;

figure 6 is a perspective view of a first adapter for optical mediums according to the invention;

figure 7 is a view of a second adapter for optical mediums according to the invention;

figure 8 is a view of a third adapter for optical mediums according to the invention;

figure 9 is a perspective view of a fourth adapter for optical mediums according to the invention;

figure 10 is a view of a fifth adapter for optical mediums according to the invention;

figure 11 is a plant view of a disc from which an optical medium according to the invention is obtained;

figure 12 shows the orbital reading of the optical support of figure 11; and

figure 13 shows the orbital reading of a different kind of optical support.

Referring first to figures 1 and 2, it is shown a first optical medium 1 according to the invention, obtained by the shearing of the central portion of a disc originally manufactured as mass memory unit, the geometrical centre of which corresponds with that already provided on said disc.

Said central hole 2 is necessary for the hooking and dragging operations by a standard disc reading unit (not shown).

In figure 3, it is instead shown a composite optical medium 3 comprising a support part 4 and an optical support part 5, obtained from a disc, as it will shown in the following with reference to figure 5, and which is coupled within a suitable seat obtained within the support part 4.

On the support part 4 it is further provided a microprocessor 7.

In the solution shown in figure 4, the optical support part 5' is provided centrally with respect to the support part 4', being in this case provided a magnetic band (not shown) behind the support part 4'.

From figure 5, a disc 10 can be observed, produced as mass memory, from which different optical mediums, such as those indicated by reference numbers 5 and 5', or the optical medium 11, which will be described in the following, or the shaped optical medium 12, can be obtained by shearing.

In the figures of the enclosed drawings, four kind of adapters are shown, namely

1) adapters to applied to the drawer of the CD reading/writing unit;

2) adapters providing a modification of the CD reading/writing unit;

3) adapters to be placed within the drawer of the CD reading/writing unit, and that can be of the mechanical or "intelligent" type;

4) adapters externally provided with respect to the CD reading/writing unit.

As already mentioned, the adapter is a support designed in order to house the writable optical medium, driving the same along a revolution motion about an orbital centre in such a way to allow the reading and writing by standard drive, usually employed for the reading and writing of discs.

Thus, the function of the adapter is that of ensuring the most absolute precision of the orbital motion of the writable object and the constant coplanarity of the same object with respect to its orbital plane.

Referring now to figure 6, it is shown an adapter 20 of the first type for optical medium according to the invention.

They are adapters comprised of specific frames, or any other kind of housing edges that can be permanently and temporarily assembled within a standard drawer of a CD reading/writing unit in order to help and/or stabilise the proper positioning of the optical medium during the hooking step of the same by the rotor of the CD reading/writing unit.

In figure 7, it is shown an adapter generally indicated by the reference number 30, providing a modification of the CD reading/writing unit, realising a notch 31.

They are adapters designed and shaped on the basis of the geometry of the drawers that usually are provided in the CD reading/writing units, in order to add to the standard functionalities, that of permanently and precisely housing an optical medium according to the invention.

In figures 8 and 9 are instead shown two solutions for mechanical adapters to be connected to the CD reading/writing unit.

Solution of figure 8 provides a passive mechanical adapter comprised of a rigid plate 41, or of any other frame, providing the housings 42 for the writable objects.

Said adapter is characterised by only mechanical functions and by the complete absence on the same medium of memories permanently and integrally implemented on the same containing addressing and or reading - writing software for the data on the same optical medium (firmware).

A second type of mechanical adapter 50, shown in figure 9, provides two arms 51 permanently coupling the mediums 52, 53 to an orbital motion about the rotation centre, which is external with respect to the same mediums 52, 53.

This adapter performs the function of "transmission gear" thus transferring the rotation motion to a writable object.

In figure 10 it is shown an adapter external with respect to the CD reading/writing unit, wherein the optical medium 61 is external with respect to the adapter 60, being provided elements 62 for the transmission of the motion.

A further type of adapter performs all the mechanical functions provided in the passive type adapters, but can also provide memories permanently and integrally implemented on the same adapter in order to support the data reading/writing addressing functions on the same writable objects. Said routines can be memorised by the help of any technology that can be employed along with the basic one: magnetic, optical, magnetic optical, microprocessors.

The invention also provide other specific adapters comprised of two parts, the first one of which has shape and dimensions corresponding to those of an ISO standard card. On the card a hole has been realised. This portion has two objects: the first one is that of allowing to house, both permanently and temporarily, a writable object; the second one is that of

being it possible to position it within the CD reading unit, to read and write the same.

The second part of the adapter is comprised of a plate wherein the matrix of the first part of the adapter has been obtained. This "plate" is then placed within the CD reading unit to lock the card during its rotation.

As already said, to obtain optical mediums according to the invention, two different operative mode can be adopted.

To obtain radial mediums, the segmentation of the discs can be used. Production of the segments is realised starting from already existing discs, to be considered as "blanks", which are segmented by the use of mechanical techniques or of others techniques, such as the shearing technique by ramming employing shearing heads designed or in any case suitable for the final object in order to segment a disk or a blank beforehand produced, to obtain sections having dimensions compatible with the production of an optical medium.

The shearing head could be shaped in such a way to obtain during the cut a particular shaping of the optical medium obtained.

Said shearing heads could be also equipped with technical control apparatuses in order to conform the head temperature to the cutting operations in such a way to optimise them and in any case to ease them. In the same way, it will be possible to design said head in such a way that the same works in a co-ordinate and synergetic way with an apparatus specific for the moulding of eventual frames or gratings on the optical medium to be produced in order to ease the following manufacturing operations.

Cutting apparatuses based on the linear cutting techniques of the blank can be also employed adopting rotating or reciprocating blades.

As alternative techniques, the exposition of plates or blanks obtained to the action of fluids at suitable pressure and speed or radiant energy supply can be employed.

Optical mediums obtained and that can be obtained have a different surface, the latter being determined by the amount of data to be treated.

Alternatively, optical mediums according to the invention can be specifically produced by the same production techniques employed for the standard discs, but modifying the production geometries.

In view of the above, changes to be introduced to the production lines can be individuated into two categories.

First, changes to the polycarbonate moulding/pressing machineries in such a way to obtain already during the first production step an object which is morphologically and geometrically different with respect to a disc. Said changes essentially concern the shape of the expansion head of the moulding press of a disc that will be designed again to conform to the moulding and to the shaping of an object having a non radial geometry.

Said change involves the new analysis and design of all the local mechanical and fluidodynamical events concurring to the exact and constant distribution of the material within the expansion chamber.

The second kind of change is that on the production cycle of the radial geometry compact disc, in such a way to be able to diversify said production lines in order to obtain, either serially with respect to the same line and parallelly with respect to the same, of the differentiated objects with respect to the standard disc with respect to their shape and geometry.

Referring to the two production processes presently employed and described in the introduction of this specification, in the first case, a possible shearing or cutting operation of the disc to obtain changes to the shape and geometry of the final product, can be inserted in any step following step "6" (extraction of the disc).

Instead, in the second case, eventual changes to the shape and geometry of the final product will be inserted in any step following the disc moulding, such as the adding of a cutting operation between steps "6" (extraction of the disc) and "10" (opposition of the dye layer on the disc). In this case, the operative dynamic of the cleaning/washing group of the edge involved during step "12" must be modified, in order to create a perimetral reference edge on a non radial surface.

In the following the orbital scanning reading employed according to the present invention to read the inventive optical mediums will be described by general terms.

Description will be referred to a disc fragment (optical medium 1 of the type shown in figure 1, hypothetically obtained by the shearing of the central portion of a disc 110 originally produced as mass memory unit.

Referring also to figure 11, different zones of the sensitive surface can be individuated in said optical medium 1, i.e. the surface that will be subjected to reading - writing operations, on the basis of well established rules.

Referring also to figure 12, it is defined as A the aggregate of all points of the surface of medium 1 and r the ray of the maximum circumference which is perimetrally tangent to one of the sides of the optical medium 1, with the centre coincident with the geometrical centre 2 of the optical medium.

By the numeral reference B, it is indicated the sub-aggregate of A comprising all the points of A and laying on any circumference having a ray lower or equal to r (see figure 12) in such a way that:

$B \subset A$ (B strictly included in A)

By C it is indicated the aggregate of all the points of the surface of the optical medium 1. i.e. of the aggregate A and not of the aggregate B:

$C \subset A$

$C \# A$

(C strictly in A but different from B)

Having thus defined the aggregates of all points present on the optical medium 1 surface, contained in different zones of the optical medium 1, the afference mode to the different surface zones can be identified involved in reading - writing activity of part of the disc reading unit.

The reading - writing of area B will occur by a continuous scanning of the surface during which any point scanned by the reading - writing group, excluding the first and the latter, will be defined by the physical adjacency and contiguity of a preceding point and a following point.

Scanning by the reading - writing group of the disc reading unit of the surface portions of the optical medium 1 containing points of aggregate C, will occur by a suitable synchronisation of the reading - writing group of the disc reading unit allowing to said group to be activated only during those moments during which the rotation period of the optical medium will bring said surface portions to projects on the same group.

Said synchronisation of the operations of the reading - writing group of the disc reading unit with respect to the mass memory motion subjected to the access operations is called intercalating synchronisation.

Referring now to figure 13, according to the invention it is possible to produce an optical medium the shape of which is that of a section the hypothetical optical medium 130 obtained by the shearing of a peripheral and out of centre portion of the same (see figure 5).

In this kind of optical medium 130, a situation occurs in which the aggregate A including all the points of the optical medium is coincident with sub-aggregate C, while it is completely absent the sub-aggregate B.

The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

CLAIMS

1. Optical medium for non-volatile data storage, characterised in that it comprises a data storage layer, readable within disc reading - writing units, by the provision or not of an adapter unit.

2. Optical medium for non-volatile data storage according to claim 1, characterised in that it is holed, provided with a symmetrically centred hole or with a symmetrically eccentric hole.

3. Optical medium for non-volatile data storage according to claim 1, characterised in that it is holed, provided with a symmetrically centred hole or with a symmetrically eccentric hole, with magnetic band opposition, bar codes, microprocessor, "contactless chips" and holograms.

4. Optical medium for non-volatile data storage according to claim 1, characterised in that it is of the not holed type, with an orbital afference geometry.

5. Optical medium for non-volatile data storage according to claim 1, characterised in that it is of the not holed type, with an orbital afference geometry with magnetic band opposition, bar codes, microprocessor, "contactless chips" and holograms.

6. Optical medium for non-volatile data storage according to one of the preceding claims, characterised in that it is obtained by cutting a previously manufactured disc, particularly said disc providing frontally, or on its active surface during the reading - writing operations, a plane and integral surface for the data storage.

7. Optical medium for non-volatile data storage according to claim 6, characterised in that said optical medium is obtained from a finished disc and can be variously shaped during the cutting step in order to obtain memories having different shape and data storage capability.

8. Optical medium for non-volatile data storage according to one of the preceding claims 1 - 5, characterised in that it is realised by employing a specific production line.

9. Optical medium for non-volatile data storage according to claim 8, characterised in that it is obtained as a flat lamina, having a shape different with respect to the disc shape, obtained by the opposition on a rigid or slightly flexible support of film, composite sandwiches (chemical reagents, photosensitive materials and magneto reactive materials) covering laminae, thus creating on its front part a surface the

optical, physical and chemical property of which are analogous to those of the "disc units" presently manufactured (CD-ROM or CDMO, CD-R, CD-WR, DVD or DVD VIDEO or AUDIO or DVD ROM or DVD RAM or DVDR or DIVX, magnetic discs, magneto optical discs) and that can be written and read within normal disc units (reading units, reading/writing units).

10. Optical medium for non-volatile data storage according to claim 8, characterised in that it is obtained by varying the geometries of the existing production lines.

11. Optical medium for non-volatile data storage according to one of the preceding claims, characterised in that it is read by an orbital scanning.

12. Adapter, characterised in that it allows the reading of the optical medium by traditional reading - writing units.

13. Adapter according to claim 12, characterised in that it is dimensioned and shaped in order to be placed within the disc drawer or charger of a normal reading unit or reading/writing unit and to reduce the "housing space" to allow a stable and precise introduction of an optical medium within the reading or reading/writing unit.

14. Adapter according to claim 13, characterised in that it is shaped in such a way not to hamper the relative motion between the "front portion" (active surface) of the optical medium and the reading group, or reading-writing group of the same apparatus.

15. Adapter according to claim 12, characterised in that it provides a mechanism for hooking to the optical medium, to connect them each other, is such a way that the adapter will be integrally dragged with the optical medium during the motion generated by the internal disc reading unit, reading/writing unit mechanical, thus contributing to equilibrate and stabilise the trajectory of the optical medium within the reading unit, reading/writing unit.

16. Adapter according to claim 12, characterised in that it provides an optical medium drawer or charger adapter, shaped in such a way to properly house and position the optical medium during the optical medium charging, hooking and dragging operations within the reading unit, reading/writing unit, and in such a way it is possible temporarily or definitively assembly it with a standard disc reading unit or reading/writing unit.

17. Adapter according to one of the claims 12 - 16, characterised in that said adapter is realised in such a way to integrate to the above mentioned functionalities the optical interface function with the drive reading - writing group in order to drive the proper positioning during the optical medium reading/writing steps.

18. Adapter according to one of the claims 12 - 17, characterised in that said adapter provides the integration of the above mentioned functionalities with the interfacing function with a memory chip or microprocessor of any kind and model and that translates the I/O (input/output) signals, originally as electric or magnetic or electromagnetic pulse train into optical pulse train to be received and acquired by the reading - writing group of an optical disc drive.

FIG. 1

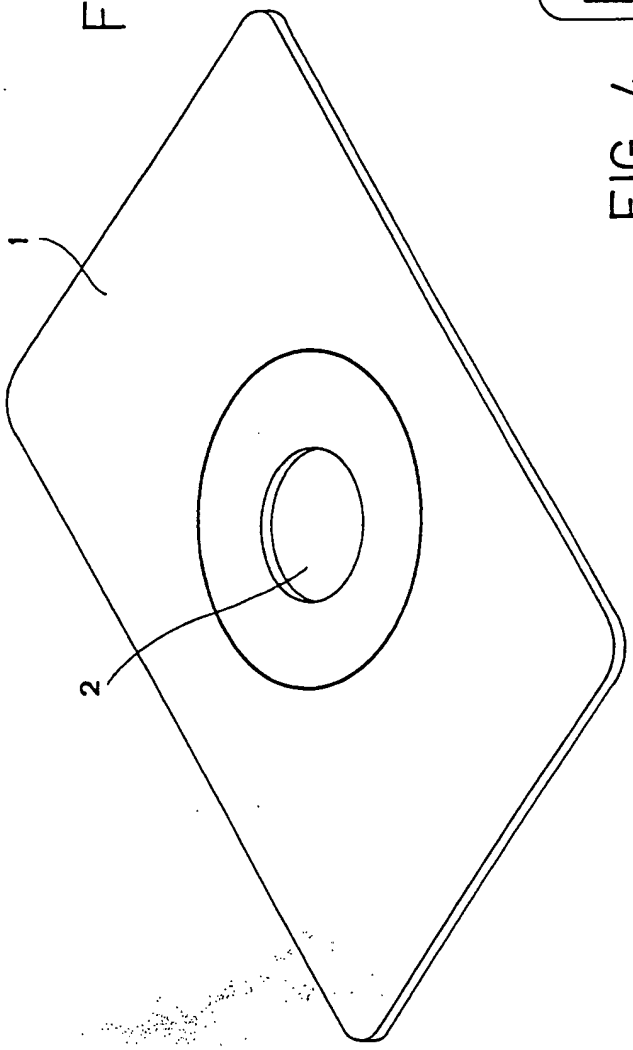


FIG. 4

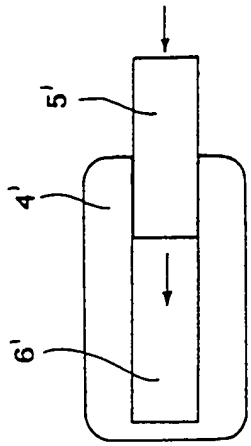
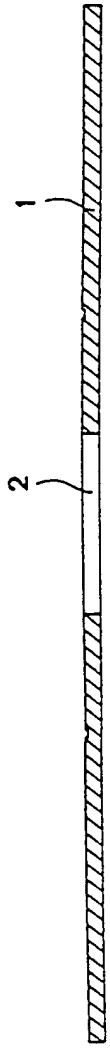


FIG. 2



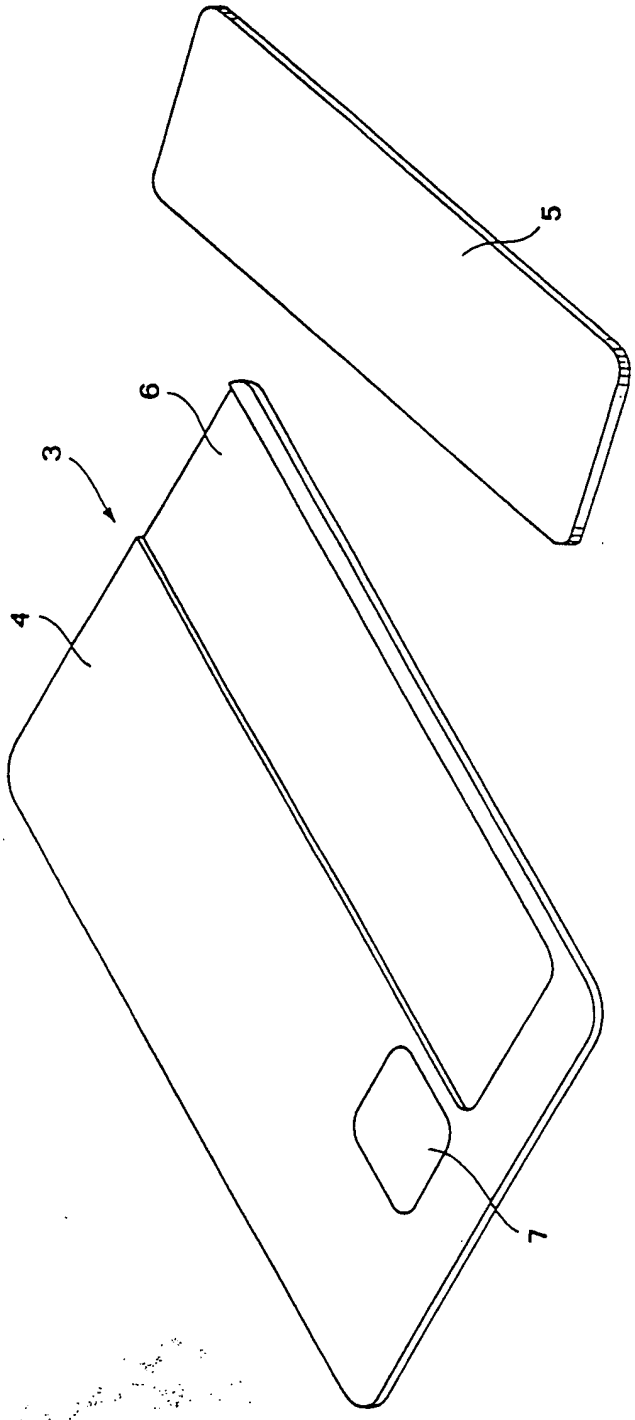


FIG. 3

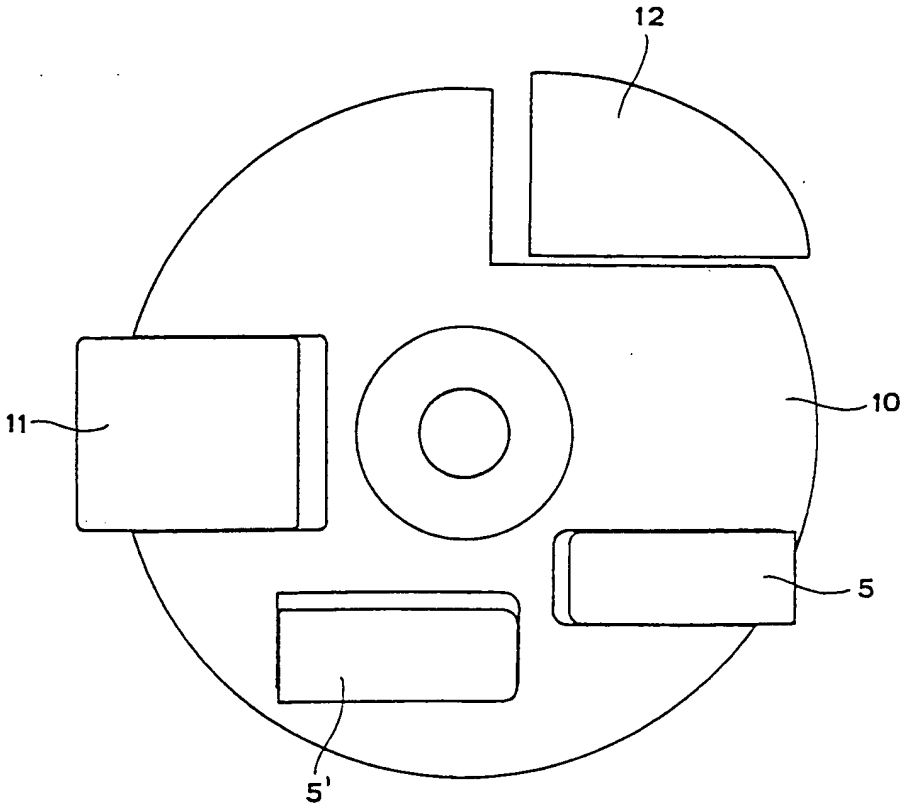


FIG. 5

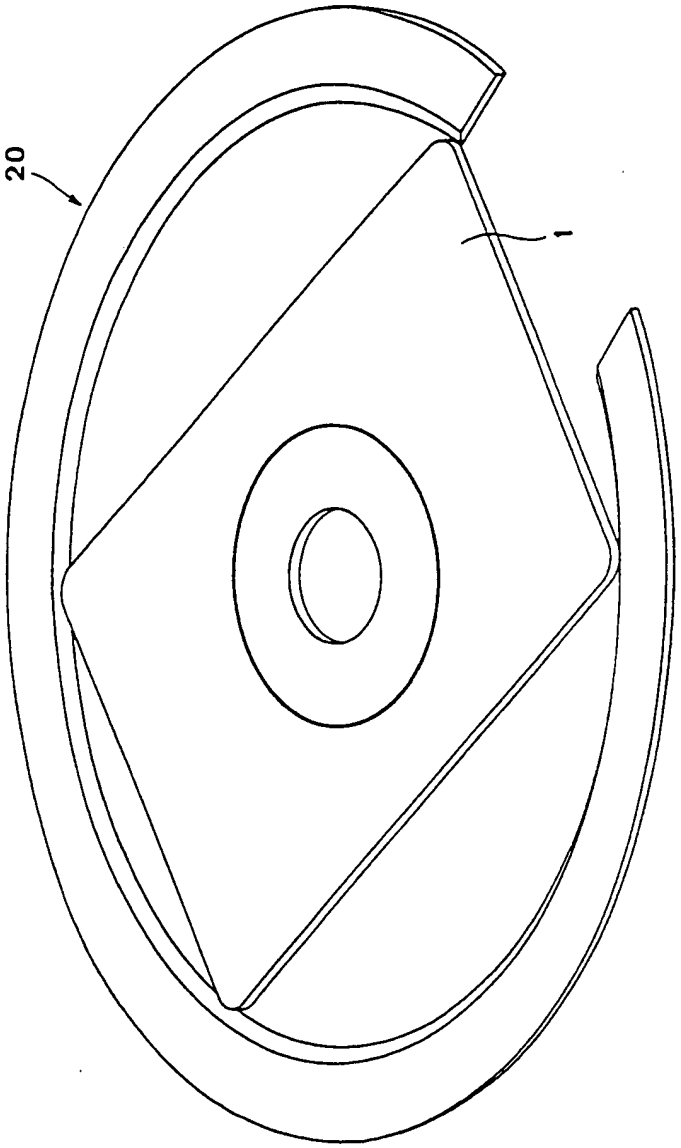


FIG. 6

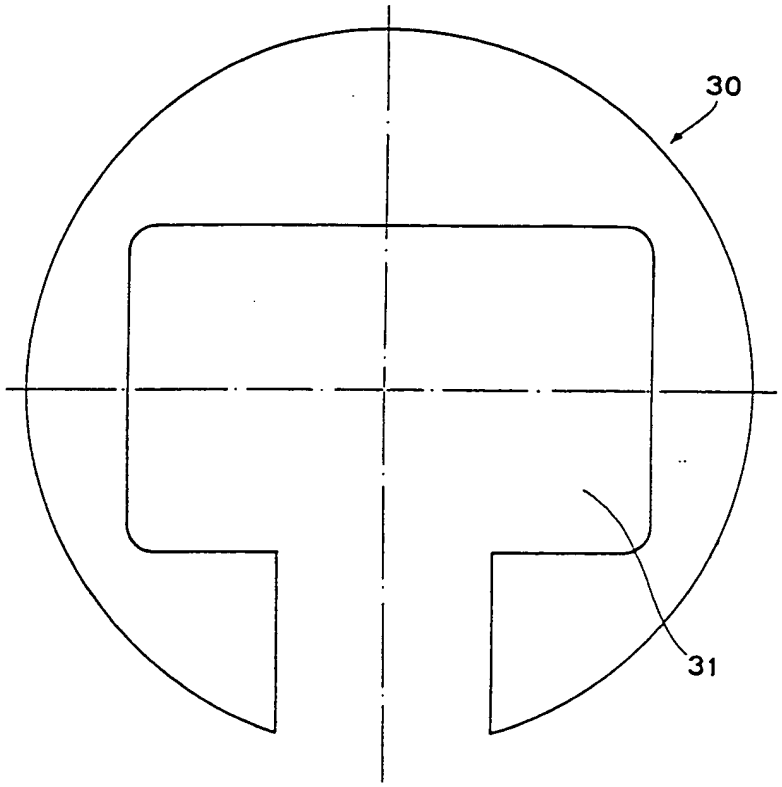


FIG. 7

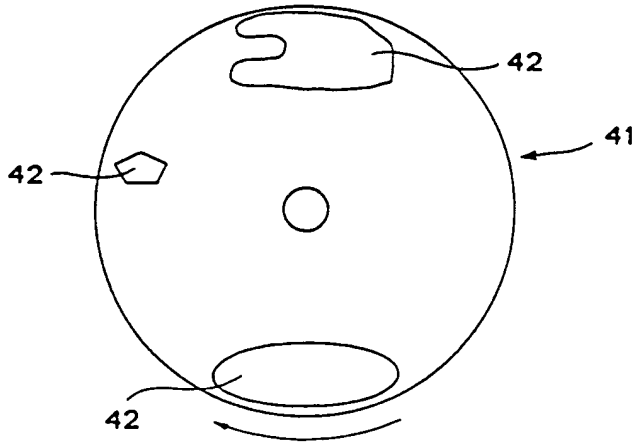
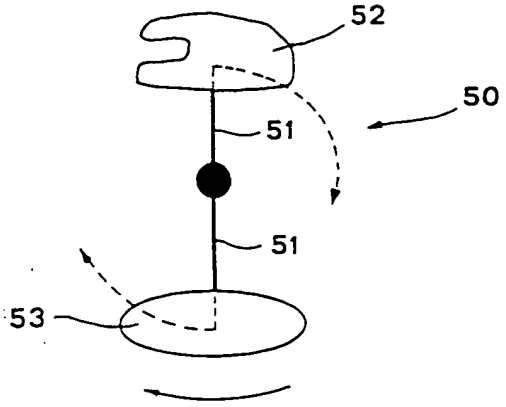


FIG. 8

FIG. 9



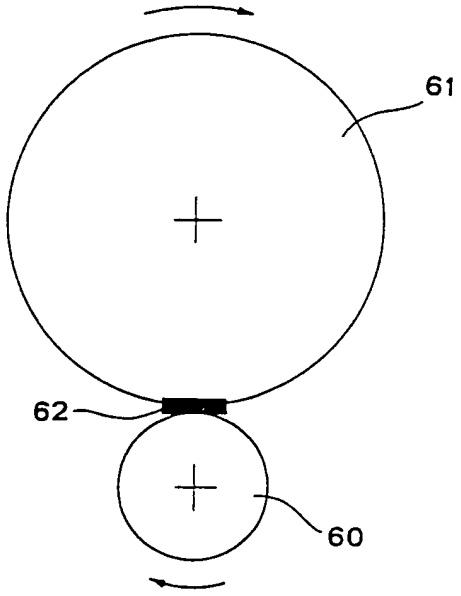


FIG. 10

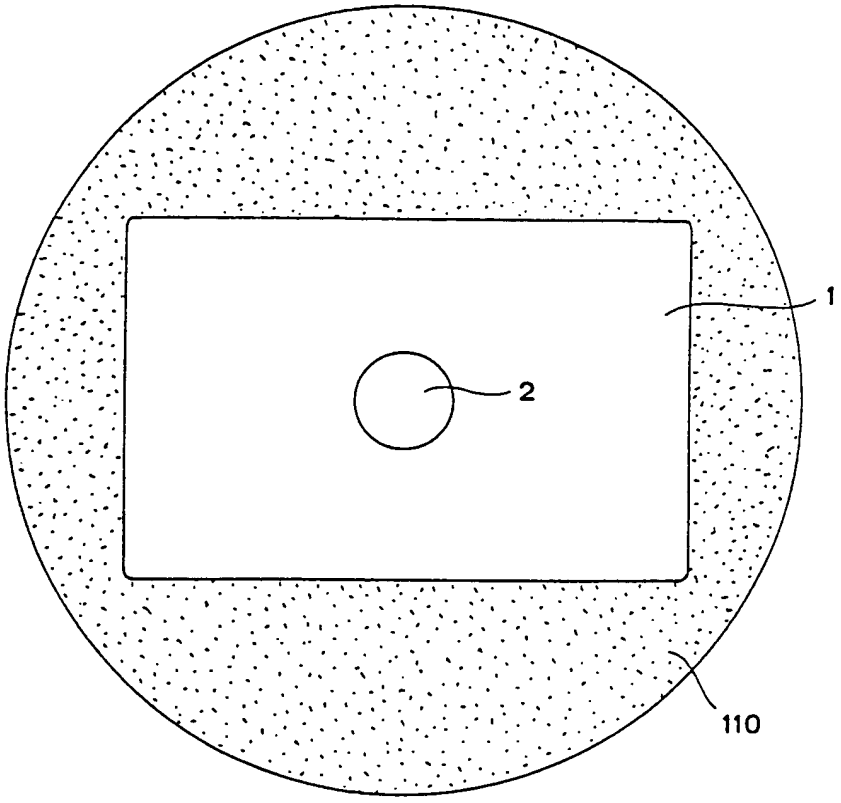


FIG. 11

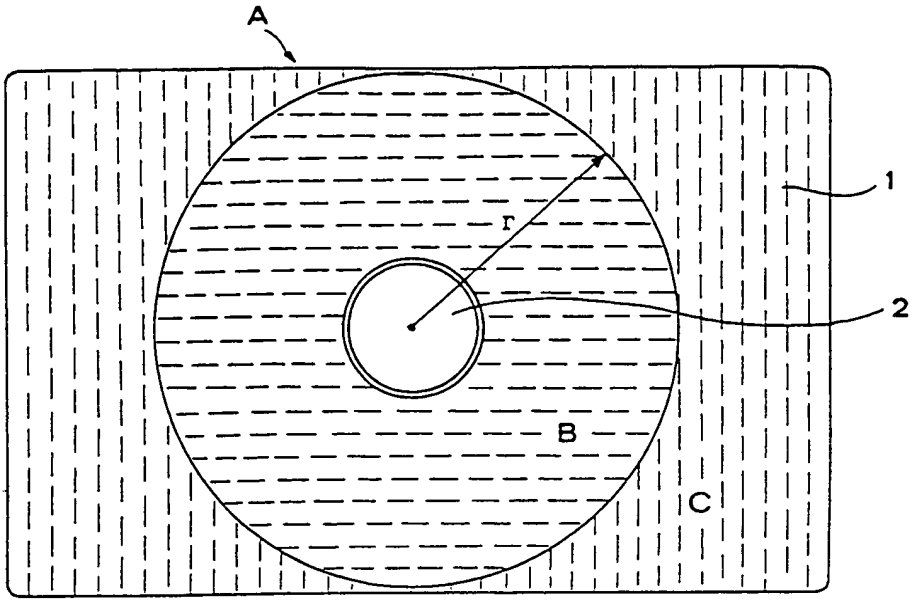


FIG. 12

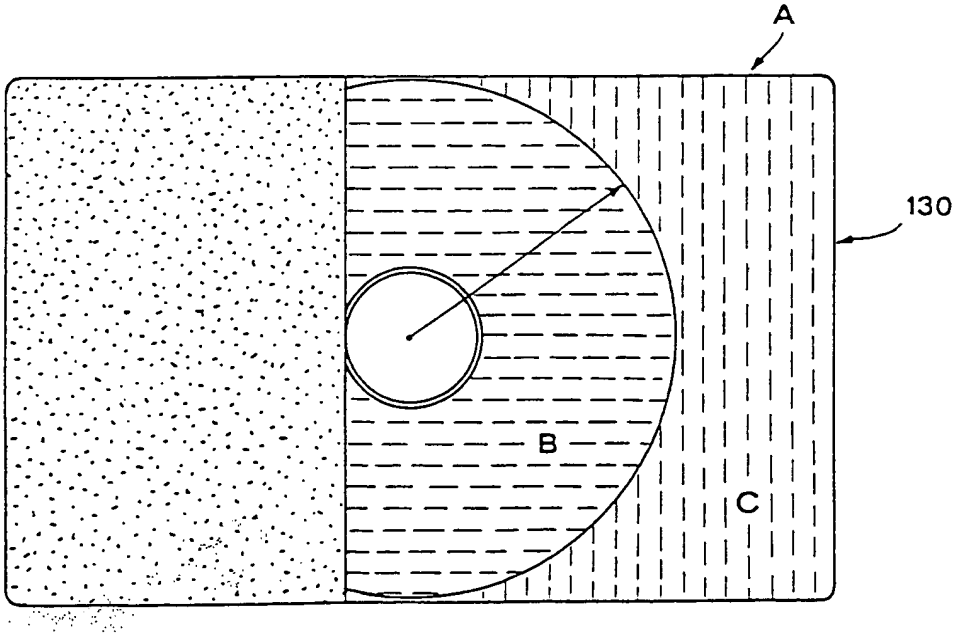


FIG. 13